Poster Presentations

[MS35-P01] REXS on $Eu_{1-x}Y_xMnO_3$ in High Magnetic Fields

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The rare earth manganites *R*MnO3 (*R*=Gd, Tb, Dy) with perovskite structure have emerged as a reference class of magnetoelectric materials among the different compounds exhibiting multiferroic behavior. $Eu_{1-x}Y_xMnO_3$ crystallizes in Pbnm space group like TbMnO3, but without magnetism at the rare earth sites, since both Eu^{3+} ($4f^6$) and Y^{3+} ($4f^0$) ions are non-magnetic [1]. Variation of Y doping allows changing the ionic radii and consequently the Mn-O-Mn angle. As such, it can serve as a tool to probe the role of rare earth magnetism in the $RMnO_3$ class of multiferroics. Magnetic order as a function of temperature and magnetic field is investigated by resonant elastic x-ray scattering (REXS) in a 14 T split coil magnet at beamline P09, PETRA III [2]. Especially we investigate the field dependence of the different magnetic modes as a function of temperature and field in the compounds $Eu_{1-x}Y_xMnO_3$ with x=0.2 and 0.3. Both compounds order antiferromagnetically below TN ~ 45K and below TC ~ 30K, spontaneous polarization occurs. Variation of incident x-ray polarization and subsequent analysis of the magnetic signal allows conclusion about the cycloid order. Application of magnetic field shows stabilization of the weakly ferromagnetic phase in $Eu_{0.8}Y_{0.2}MnO_3$ just below TC and identical ordering behavior of the two compounds in the low temperature region.

[1] J. Hemberger *et al.,* Phys. Rev. B, 035118 (2007).
[2] J. Strempfer *et al.,* J. Synchr. Rad. 30 (2013).

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